

PATENT

INSTITUT FRANÇAIS DU PETROLE

**METHOD FOR DETECTING AND CONTROLLING HYDRATE FORMATION
AT ANY POINT OF A PIPE CARRYING
MULTIPHASE PETROLEUM FLUIDS**

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ABSTRACT

- Method intended for continuous detection and control of hydrate formation at any point of a pipe carrying multiphase petroleum fluids. The method uses a compositional code allowing to simulate the circulation modes and conditions at any point of the pipe, considering that the fluid mixture is substantially continuously at equilibrium, that the composition of the multiphase mixture is variable all along the pipe and that the mass of each constituent of the mixture is globally defined by a mass conservation equation regardless of its phase state. The thermodynamic hydrate formation conditions are detected after a particular stage of grouping the petroleum fluids into pseudo-components so as to isolate the hydrate forming components, with definition for each one of a mass fraction and of a certain number of characteristic physical quantities, and the data relative to these particular fractions are applied to the modules so as to determine at any point the hydrate dissociation temperature (T_d). A control device (C) can also be used to compare the temperature of the petroleum fluids with this dissociation temperature (T_d), and measures designed to fight hydrate formation can be applied under the control of this control device (C). The method can be applied for deep-sea petroleum production for example.